User Services Requirements - Peripherals

INPUT®

USER SERVICES REQUIREMENTS
PERIPHERALS

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CONTENTS

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PERIPHERALS

EXHIBITS

I INTRODUCTION

- User Services Requirements--Peripherals is a supplementary report produced by INPUT as part of the 1985 Customer Service Program for the United States. The report is provided to clients of the Large System and Small System User Requirements Module in order to provide these clients with a more comprehensive understanding of the user's total system service needs.

- Because the purpose of this report is to provide supplementary data to the User Services Requirements reports (for large and small systems), no analysis of the data is provided.

- The overall emphasis of this data report is to identify user requirements and current levels of satisfaction with selected disk drive and high speed printer manufacturers. Products and vendors surveyed are listed in Exhibit I-1. Users were encouraged to respond according to their needs rather than according to pre-established contractual agreements. INPUT believes that user responses unrestrained by current service contracts are much more representative of true market demands and therefore will be more valuable to service market planners.

- The reader will note that INPUT has organized the exhibits in a fashion that facilitates user satisfaction analysis within each vendors' samples. This presents the strengths and weaknesses of each vendor as reported by that vendor's users, while highlighting any improvements or degradations in service quality between 1983 (which was the last year INPUT analyzed peripheral user service requirements) and the current year.

EXHIBIT I-1

INTERVIEW SAMPLE BY PRODUCT AND VENDOR

PRINTERS		
VENDOR	MODEL NUMBER	NUMBER SURVEYED
Centronics	6XXX, 6XX	12
Decision Data	66XX	25
IBM	3800	35
Xerox	9700	43
Total		115

DISK DRIVES		
VENDOR	MODEL NUMBER	NUMBER SURVEYED
CDC	333XXX	21
IBM	33XX	33
Memorex	36XX	9
STC	86XX	8
Total		71

- User attitudes toward pricing and user receptivity to third-party maintenance will be further explored in future INPUT reports entitled Customer Services Pricing Analysis and User Receptivity to Third-Party Maintenance.

A. DEMOGRAPHICS

- As shown in Exhibit I-1, INPUT bases the following analysis on 186 telephone interviews of high-speed printer and disk drive users. The interview project was conducted between February and March of 1985, using the interview provided in Appendix A.

- As is INPUT's custom, a concerted effort was made to contact the person who had day-to-day contact with the product being surveyed, and who was responsible for, or at least familiar with, the handling of service pricing. As shown in Exhibit I-2, that person was most likely the data processing (DP) manager or operations manager.

- Exhibit I-3 also breaks down the 1985 peripheral user sample by the industry each respondent company serves. As can be expected, the majority of responses come from the manufacturing industries (both discrete and process), banking, and the services industries.

- As can be expected, the bulk of the respondents receive at least prime shift (8-5, Monday through Friday) coverage, although a large number of certain products, such as the IBM 3800 printer and the Control Data Corporation disk drives, received extended coverage. Exhibit I-4 provides a complete breakdown of the sample by contractual coverage.

- Exhibit I-5 provides a glimpse at the amount of experience that the peripheral user respondents have with third-party maintenance. As previously stated, INPUT will explore this issue in much greater detail later in the year.

EXHIBIT I-2

INTERVIEW SAMPLE RESPONDENTS BY TITLE

TITLE	USER SURVEYED
VP (Data Processing)	21
Director of Computer Center, IS Director	15
Data Processing Manager	42
Operations Manager	53
Supervisor	15
Other	40
Total	186

EXHIBIT I-3

RESPONDENT SAMPLE BY INDUSTRY SECTOR

INDUSTRY SECTOR	USERS SURVEYED
Process	36
Discrete	24
Transportation	3
Utilities	8
Banking	51
Insurance	13
Medical	4
Education	4
Distribution (Wholesale/Retail)	6
Government	5
Services	26
Other	6
Total	186

EXHIBIT I-4

RESPONDENT SAMPLE BY SERVICE COVERAGE

PRINTERS	PERCENT RECEIVE BMMC	PERCENT RECEIVE T&M	PERCENT RECEIVE EXTENDED COVERAGE
Centronics	82%	18%	0
Decision Data	88	4	8%
IBM	49	0	51
Xerox	79	0	21
DISK DRIVES			
CDC	67%	0	33%
IBM	76	0	24
Memorex	78	0	22
STC	88	0	12

EXHIBIT I-5

PERIPHERAL USERS EXPERIENCE WITH TPM

PRINTERS	CURRENTLY USE TPM (Percent)	NOT USING, CONSIDERED USING TPM (Percent)
Centronics	36%	18%
Decision Data	8	40
IBM	17	46
Xerox	19	14
DISK DRIVE		
CDC	33%	29%
IBM	18	27
Memorex	11	27
STC	25	50

- Exhibit I-6 presents demographic data concerning both the installed age of the respondents peripheral products and the length of service relationship between the peripheral user and their service vendors.

B. METHODOLOGY

- The following exhibits were a result of the questionnaire included in the appendices of this report. The data was accumulated and stored into an IBM PC using dBASE III, a relational data base management system. The data was then analyzed using the statistical package known as ABSTAT.

- Appendix B provides a detailed description on the use of the data that produced the following exhibits, including instructions to clients who wish to make additional cuts of the data.

EXHIBIT I-6

INSTALLED AGE OF PERIPHERALS AND
LENGTH OF RELATIONSHIP WITH SERVICE VENDOR

PRINTER	MEAN INSTALLED AGE (Years)	MEAN LENGTH OF SERVICE RELATIONSHIP (Years)
Centronics	4.8	4.3
Decision Data	2.9	3.5
IBM	3.5	3.7
Xerox	3.2	3.2
DISK DRIVE		
CDC	3.2	4.6
IBM	5.1	5.6
Memorex	4.1	4.1
STC	3.3	4.5

EXHIBIT II-1

CDC SERVICE PERFORMANCE AND
USER RATINGS COMPARISON
1983-1985

SERVICE CATEGORY	PERFORMANCE CHANGE		USER RATING*	
	DECLINE	IMPROVE	1983	1985
Hardware Maintenance		0.4	7.5	7.9
Hardware Documentation	-1.1		7.7	6.6
Hardware Training	-1.9		7.3	5.4
Hardware Consulting	-2.1		8.0	5.9

-5.0 -1.0 No Change 1.0 5.0

* Rating: 1 = Low, 10 = High

EXHIBIT II-2

VENDOR STRENGTHS AND WEAKNESSES

CDC

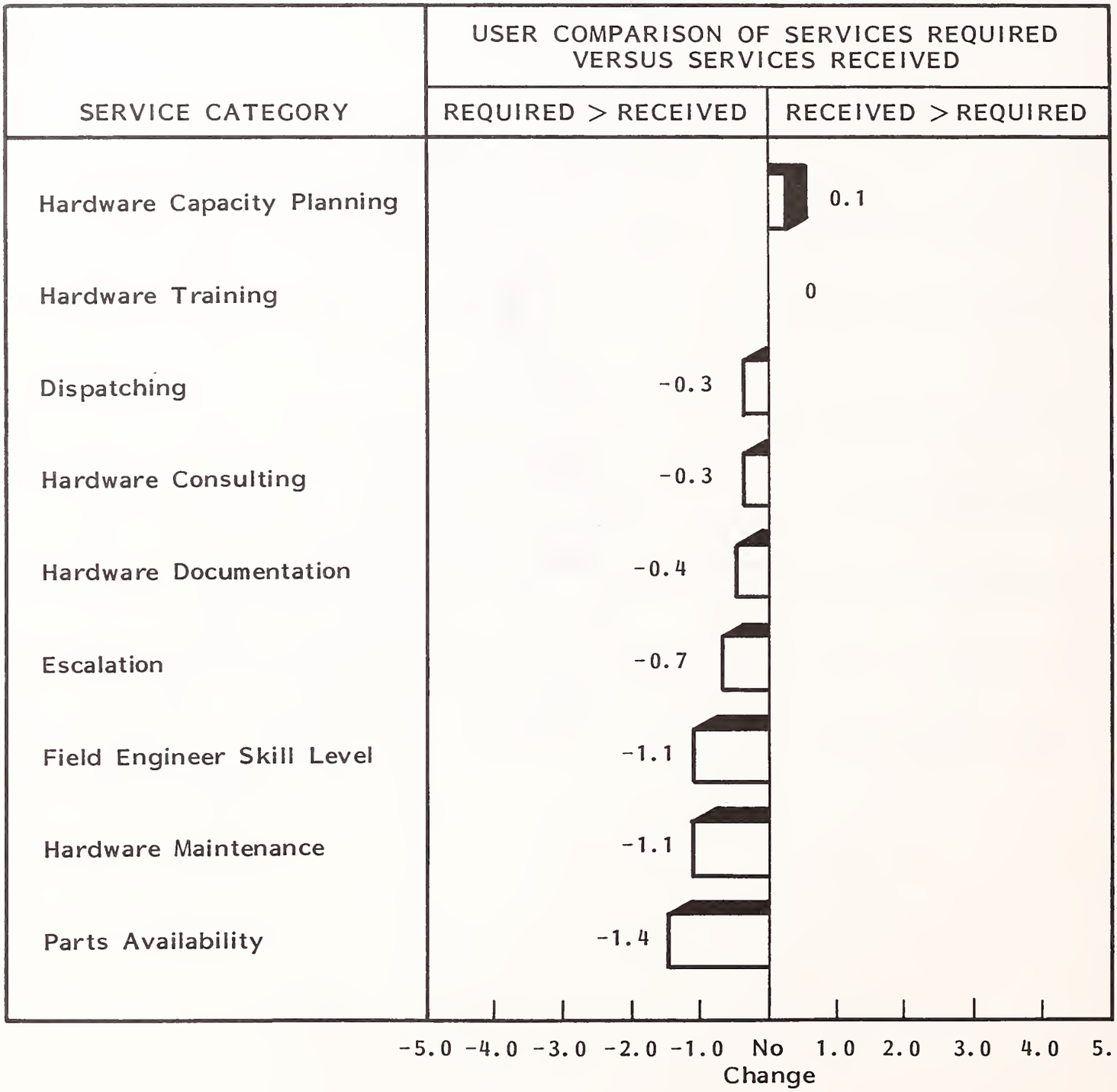


EXHIBIT II-3

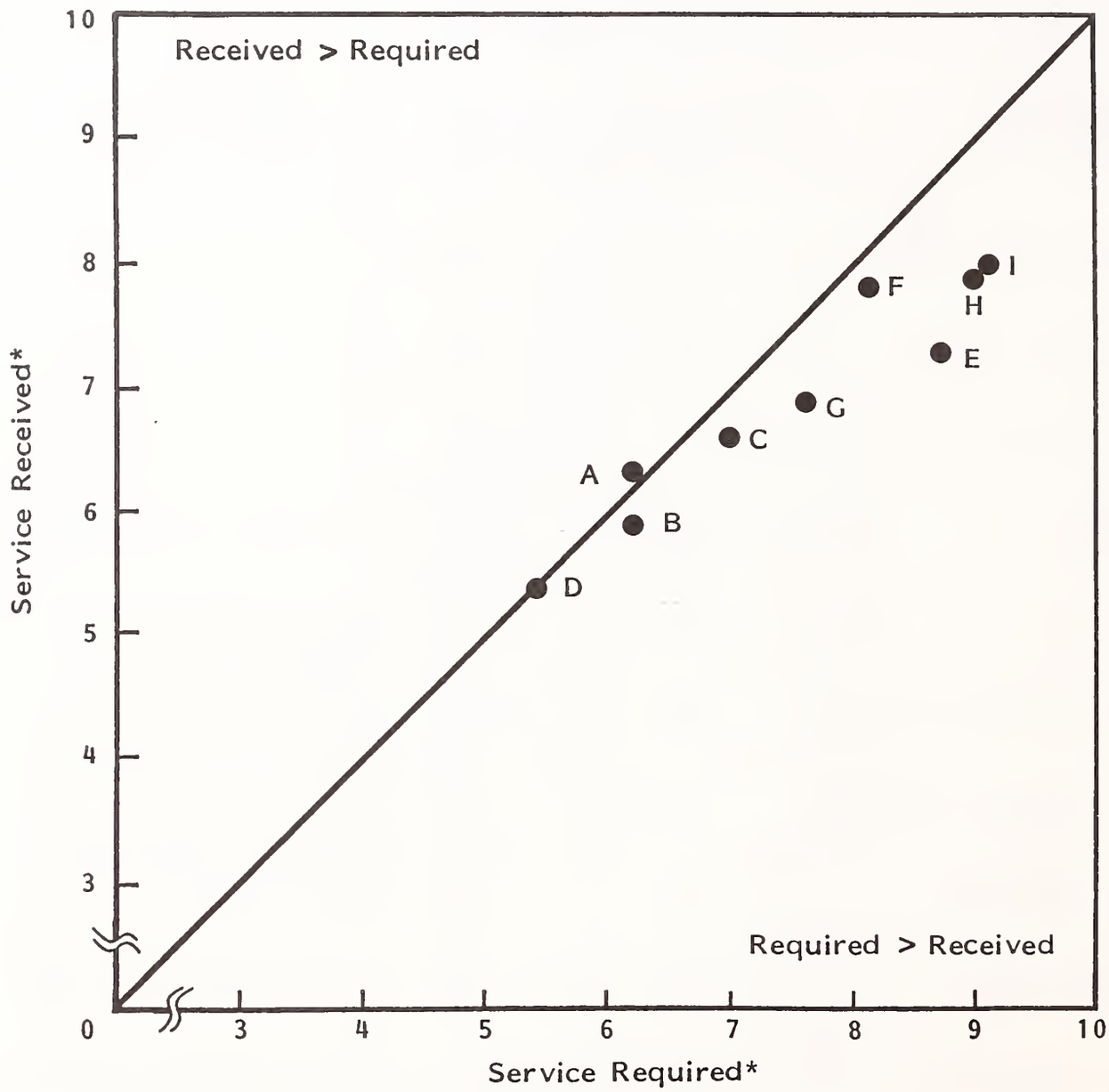
1985 USER SATISFACTION WITH HARDWARE SERVICES
CDC

SERVICE CATEGORY	LEVEL OF SERVICE		PERCENT OF USERS SATISFIED
	REQUIRED*	RECEIVED*	
Field Engineer Skill Level	9.1	8.0	43%
Hardware Maintenance	9.0	7.9	48
Parts Availability	8.7	7.3	43
Dispatching	8.1	7.8	52
Escalation	7.6	6.9	47
Hardware Documentation	7.0	6.6	52
Hardware Capacity Planning	6.2	6.3	41
Hardware Consulting	6.2	5.9	47
Hardware Training	5.4	5.4	47

*Rating: 1 = Low, 10 = High

EXHIBIT II-4

CDC HARDWARE SUPPORT
USER REQUIREMENTS VERSUS LEVEL OF SERVICE RECEIVED



A. Hardware Capacity Planning
B. Hardware Consulting
C. Hardware Documentation
D. Hardware Training
E. Parts Availability
F. Dispatching
G. Escalation
H. Hardware Maintenance
I. Field Engineer Skill Level

*Rating: 1 = Low, 10 = High

EXHIBIT II-5

CDC HARDWARE SERVICE COMPONENT DATA

SERVICE COMPONENT	1985 USER RATING*
Overall Satisfaction with Hardware Service	8.0
Satisfaction with System Availability	8.4
Satisfaction with Response Time	8.4
Satisfaction with Repair Time	8.1

SERVICE COMPONENT	1985 VENDOR PERFORMANCE*
Average Number of Hardware Interruptions per Month	2.9
Average Hardware Response Time (Hours)	1.6
Average Hardware Repair Time (Hours)	1.7

* Rating: 1 = Low, 10 = High

EXHIBIT II-6

USER REQUIREMENTS FOR EXTENDED SERVICES
CDC

SERVICE CATEGORY	PERCENT OF USERS REQUIRING SERVICE	AVERAGE PREMIUM USERS ARE WILLING TO PAY (Percent of BMMC)
Preventive Maintenance During Non-Prime Hours	76%	2.4
On-Site Spare Parts	62	2.2
Stand-By Coverage	33	2.9
Increased Software Support	24	1.6
On-Site Engineer	19	1.0
Remote Diagnostics	9	0.9

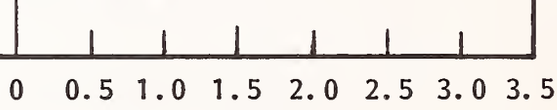
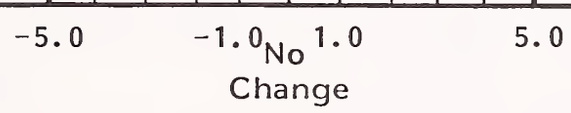


EXHIBIT II-7

IBM SERVICE PERFORMANCE AND
USER RATINGS COMPARISON
1983-1985

SERVICE CATEGORY	PERFORMANCE CHANGE		USER RATING*	
	DECLINE	IMPROVE	1983	1985
Hardware Consulting		1.2	6.1	7.3
Hardware Documentation		0.9	6.8	7.7
Hardware Maintenance		0.7	7.7	8.4
Hardware Training		0.1	6.4	6.5



* Rating: 1 = Low, 10 = High

EXHIBIT II-8

VENDOR STRENGTHS AND WEAKNESSES

IBM

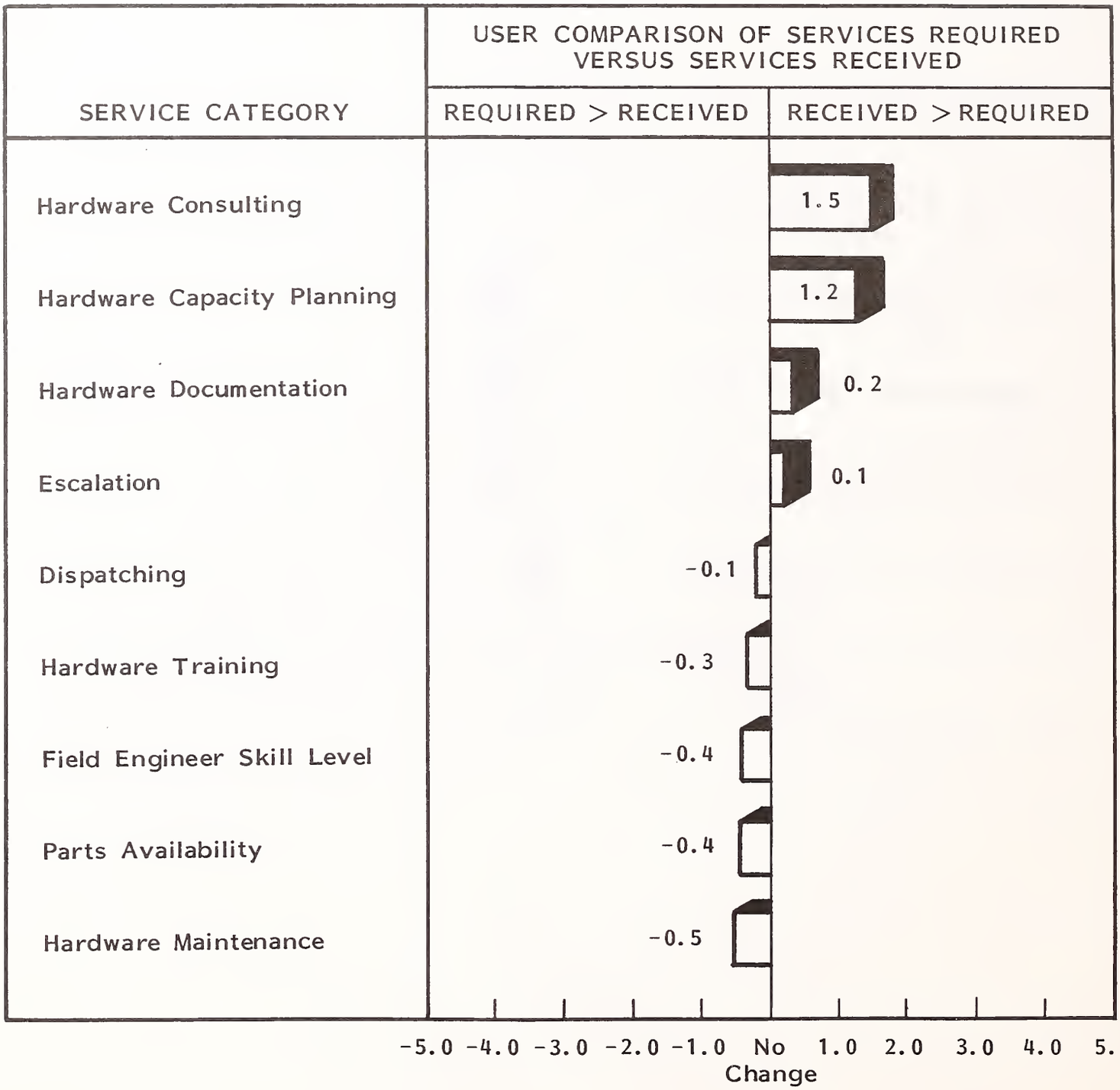


EXHIBIT II-9

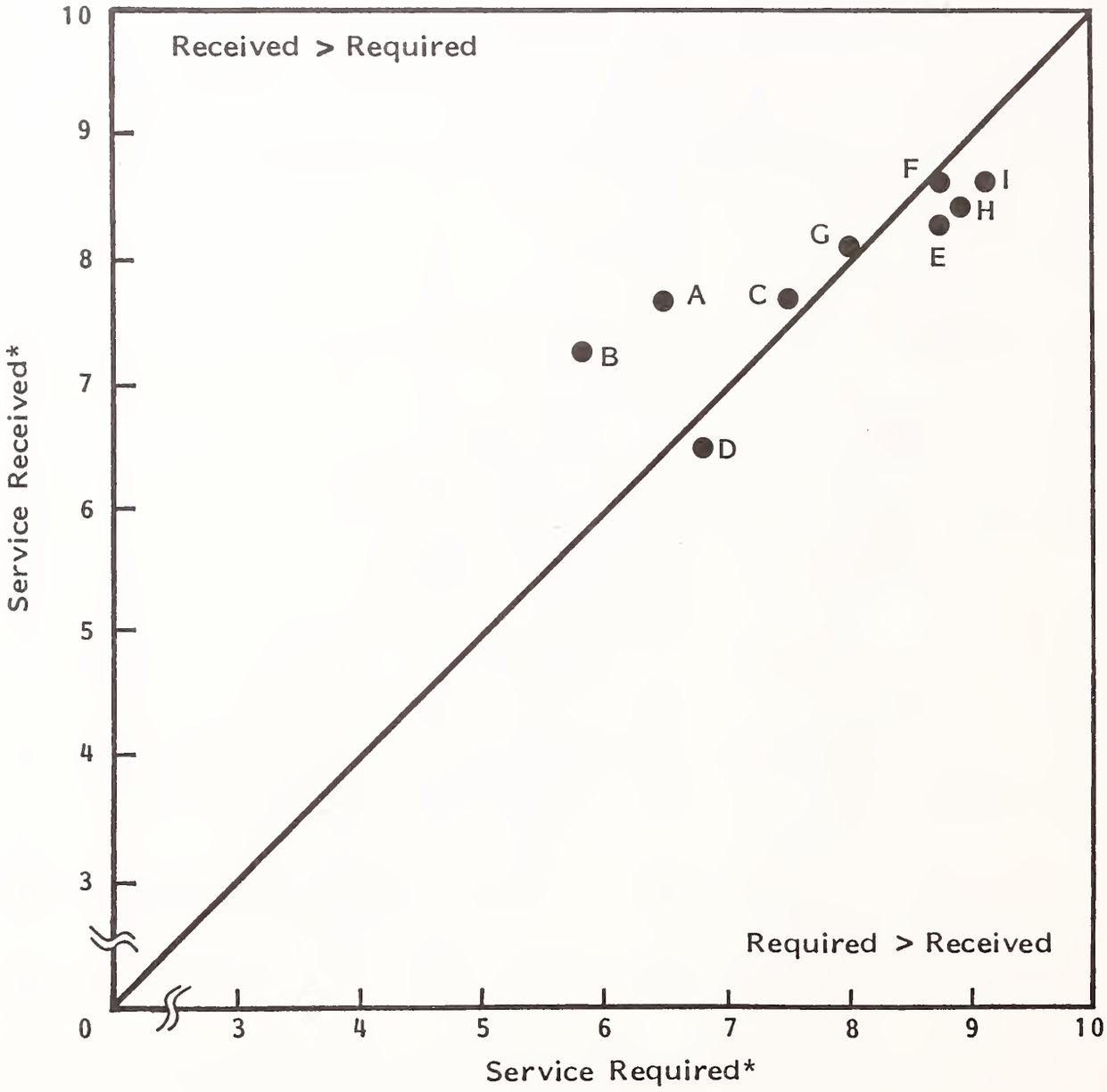
1985 USER SATISFACTION WITH HARDWARE SERVICES
IBM

SERVICE CATEGORY	LEVEL OF SERVICE		PERCENT OF USERS SATISFIED
	REQUIRED*	RECEIVED*	
Field Engineer Skill Level	9.1	8.7	70%
Hardware Maintenance	8.9	8.4	61
Dispatching	8.7	8.6	81
Parts Availability	8.7	8.3	56
Escalation	8.0	8.1	81
Hardware Documentation	7.5	7.7	71
Hardware Training	6.8	6.5	57
Hardware Consulting	5.8	7.3	80
Hardware Capacity Planning	6.5	7.7	74

*Rating: 1 = Low, 10 = High

EXHIBIT II-10

IBM HARDWARE SUPPORT
USER REQUIREMENTS VERSUS LEVEL OF SERVICE RECEIVED



A. Hardware Capacity Planning
B. Hardware Consulting
C. Hardware Documentation
D. Hardware Training
E. Parts Availability
F. Dispatching
G. Escalation
H. Hardware Maintenance
I. Field Engineer Skill Level

*Rating: 1 = Low, 10 = High

EXHIBIT II-11

IBM HARDWARE SERVICE COMPONENT DATA

SERVICE COMPONENT	1985 USER RATING*
Overall Satisfaction with Hardware Service	8.6
Satisfaction with System Availability	8.6
Satisfaction with Response Time	8.4
Satisfaction with Repair Time	8.7

SERVICE COMPONENT	1985 VENDOR PERFORMANCE*
Average Number of Hardware Interruptions per Month	1.3
Average Hardware Response Time (Hours)	1.4
Average Hardware Repair Time (Hours)	1.8

* Rating: 1 = Low, 10 = High

EXHIBIT II-12

USER REQUIREMENTS FOR EXTENDED SERVICES

IBM

SERVICE CATEGORY	PERCENT OF USERS REQUIRING SERVICE	AVERAGE PREMIUM USERS ARE WILLING TO PAY (Percent of BMMC)
Preventive Maintenance During Non-Prime Hours	61%	2.2
On-Site Spare Parts	45	2.0
Remote Diagnostics	39	1.8
Increased Software Support	30	1.6
On-Site Engineer	24	1.4
Stand-By Coverage	15	1.1

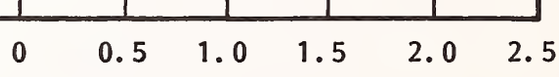
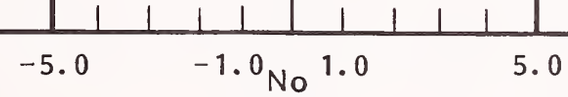


EXHIBIT II-13

MEMOREX SERVICE PERFORMANCE AND
USER RATING COMPARISON
1983-1985

SERVICE CATEGORY	PERFORMANCE CHANGE		USER RATING*	
	DECLINE	IMPROVE	1983	1985
Hardware Consulting		1.8	6.5	8.3
Hardware Maintenance		1.2	7.7	8.9
Hardware Training		1.1	6.5	7.6
Hardware Documentation		0.9	7.3	8.2



* Rating: 1 = Low, 10 = High

EXHIBIT II-14

VENDOR STRENGTHS AND WEAKNESSES
MEMOREX

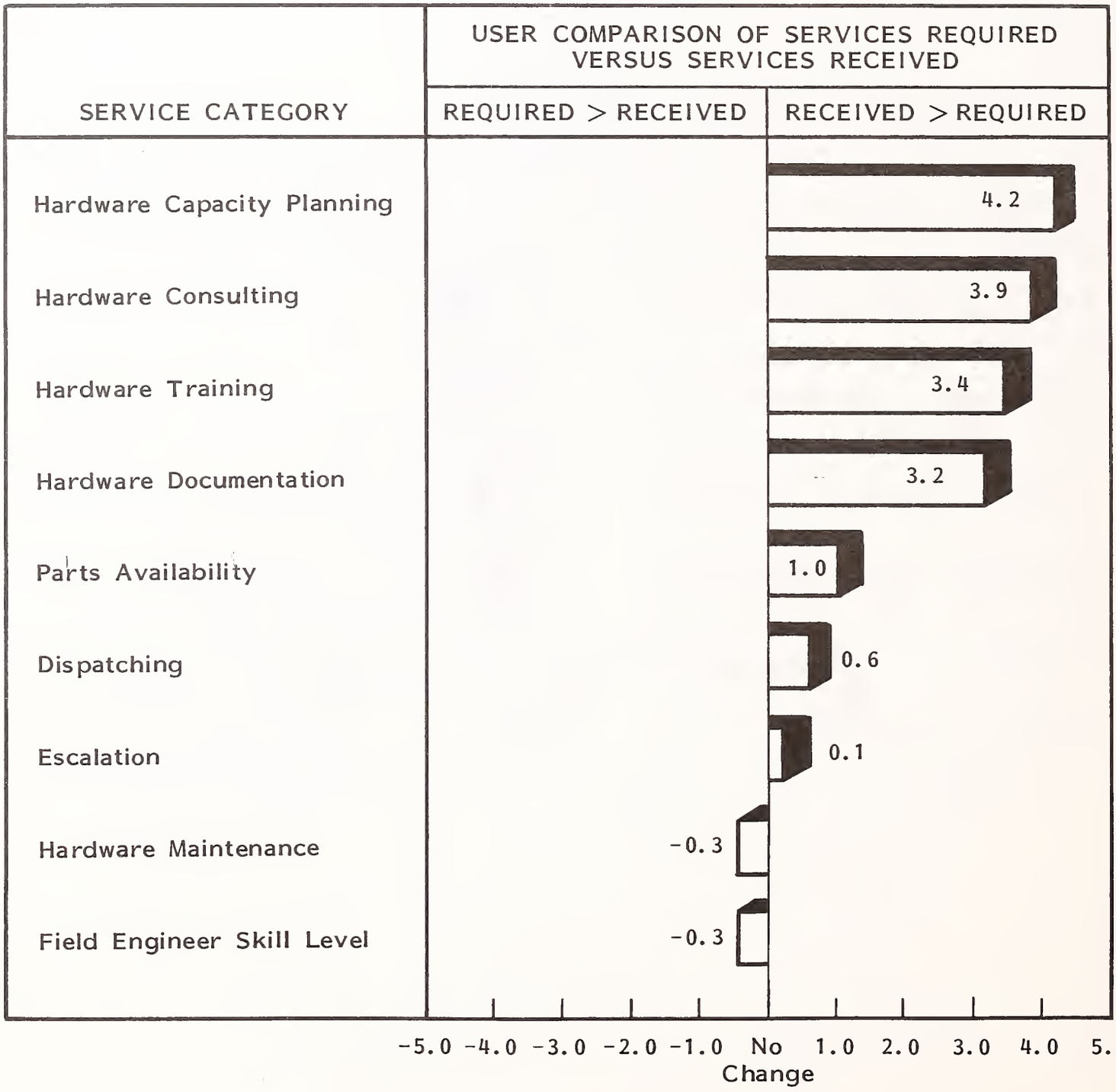


EXHIBIT II-15

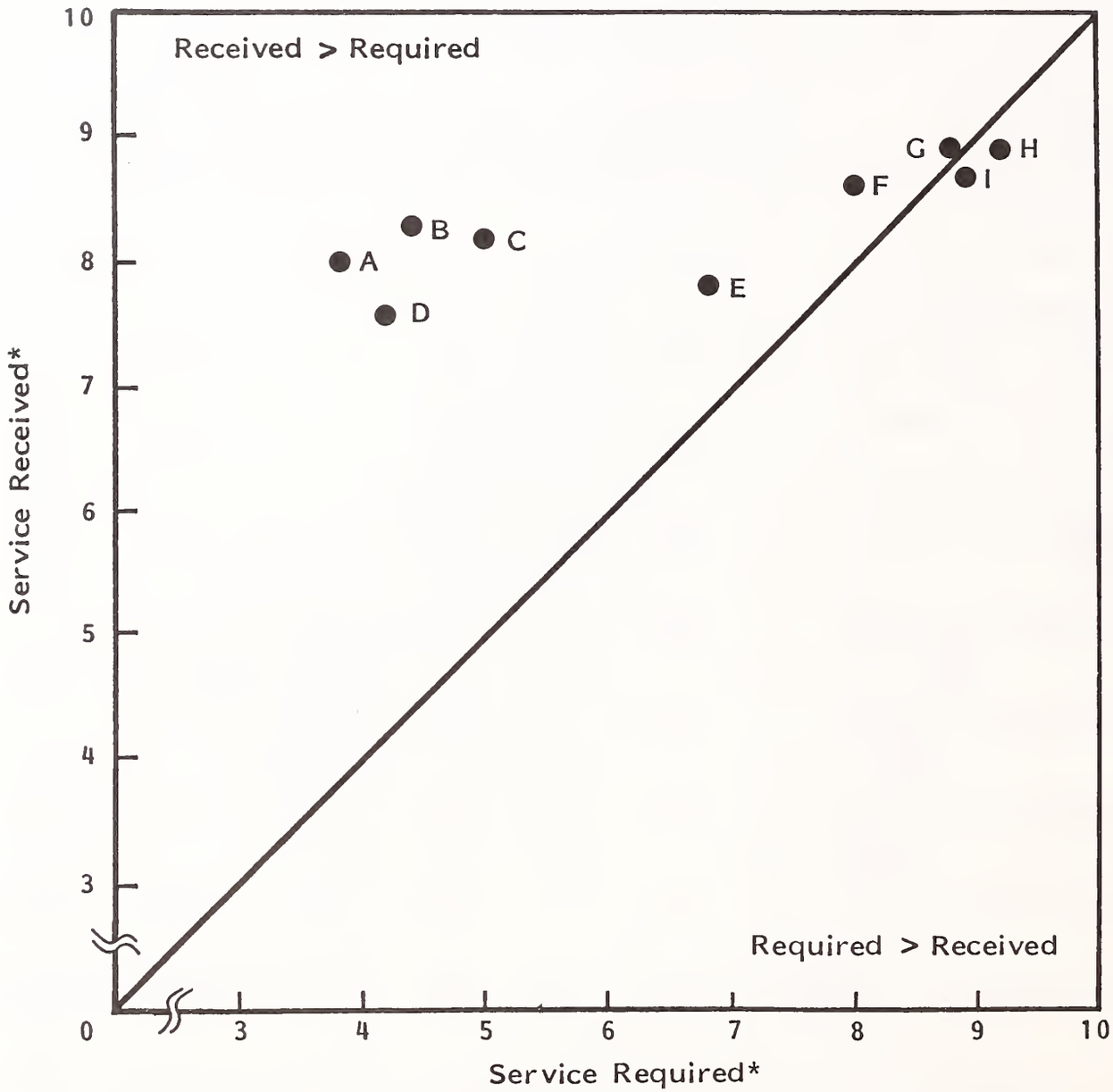
1985 USER SATISFACTION WITH HARDWARE SERVICES
MEMOREX

SERVICE CATEGORY	LEVEL OF SERVICE		PERCENT OF USERS SATISFIED
	REQUIRED*	RECEIVED*	
Hardware Maintenance	9.2	8.9	56%
Field Engineer Skill Level	9.0	8.7	67
Escalation	8.8	8.9	88
Dispatching	8.0	8.6	89
Parts Availability	6.8	7.8	63
Hardware Documentation	5.0	8.2	83
Hardware Consulting	4.4	8.3	100
Hardware Training	4.2	7.6	100
Hardware Capacity Planning	3.8	8.0	100

*Rating: 1 = Low, 10 = High

EXHIBIT II-16

MEMOREX HARDWARE SUPPORT
USER REQUIREMENTS VERSUS LEVEL OF SERVICE RECEIVED



A. Hardware Capacity Planning
B. Hardware Consulting
C. Hardware Documentation
D. Hardware Training
E. Parts Availability
F. Dispatching
G. Escalation
H. Hardware Maintenance
I. Field Engineer Skill Level

*Rating: 1 = Low, 10 = High

EXHIBIT II-17

MEMOREX HARDWARE SERVICE COMPONENT DATA

SERVICE COMPONENT	1985 USER RATING*
Overall Satisfaction with Hardware Service	8.2
Satisfaction with System Availability	9.0
Satisfaction with Response Time	8.7
Satisfaction with Repair Time	8.7

SERVICE COMPONENT	1985 VENDOR PERFORMANCE*
Average Number of Hardware Interruptions per Month	0.8
Average Hardware Response Time (Hours)	1.6
Average Hardware Repair Time (Hours)	1.8

* Rating: 1 = Low, 10 = High

EXHIBIT II-18

USER REQUIREMENTS FOR EXTENDED SERVICES

MEMOREX

SERVICE CATEGORY	PERCENT OF USERS REQUIRING SERVICE	AVERAGE PREMIUM USERS ARE WILLING TO PAY (Percent of BMMC)
Preventive Maintenance Dureing Non-Prime Hours	22%	1.3
Increased Software Support	11	0.1
On-Site Engineer	11	0.1
On-Site Spare Parts	11	0.1
Remote Diagnostics	11	0.1
Stand-By Coverage	0	0.1

EXHIBIT II-19

STC SERVICE PERFORMANCE AND
USER RATINGS COMPARISON
1983-1985

SERVICE CATEGORY	PERFORMANCE CHANGE		USER RATING*	
	DECLINE	IMPROVE	1983	1985
Hardware Consulting		1.7	6.4	8.1
Hardware Maintenance		0.9	7.6	8.5
Hardware Documentation		0.9	6.5	7.4
Hardware Training	-0.1		6.9	6.8

-5.0 -1.0 No Change 1.0 5.0

* Rating: 1 = Low, 10 = High

EXHIBIT II-20

VENDOR STRENGTHS AND WEAKNESSES

STC

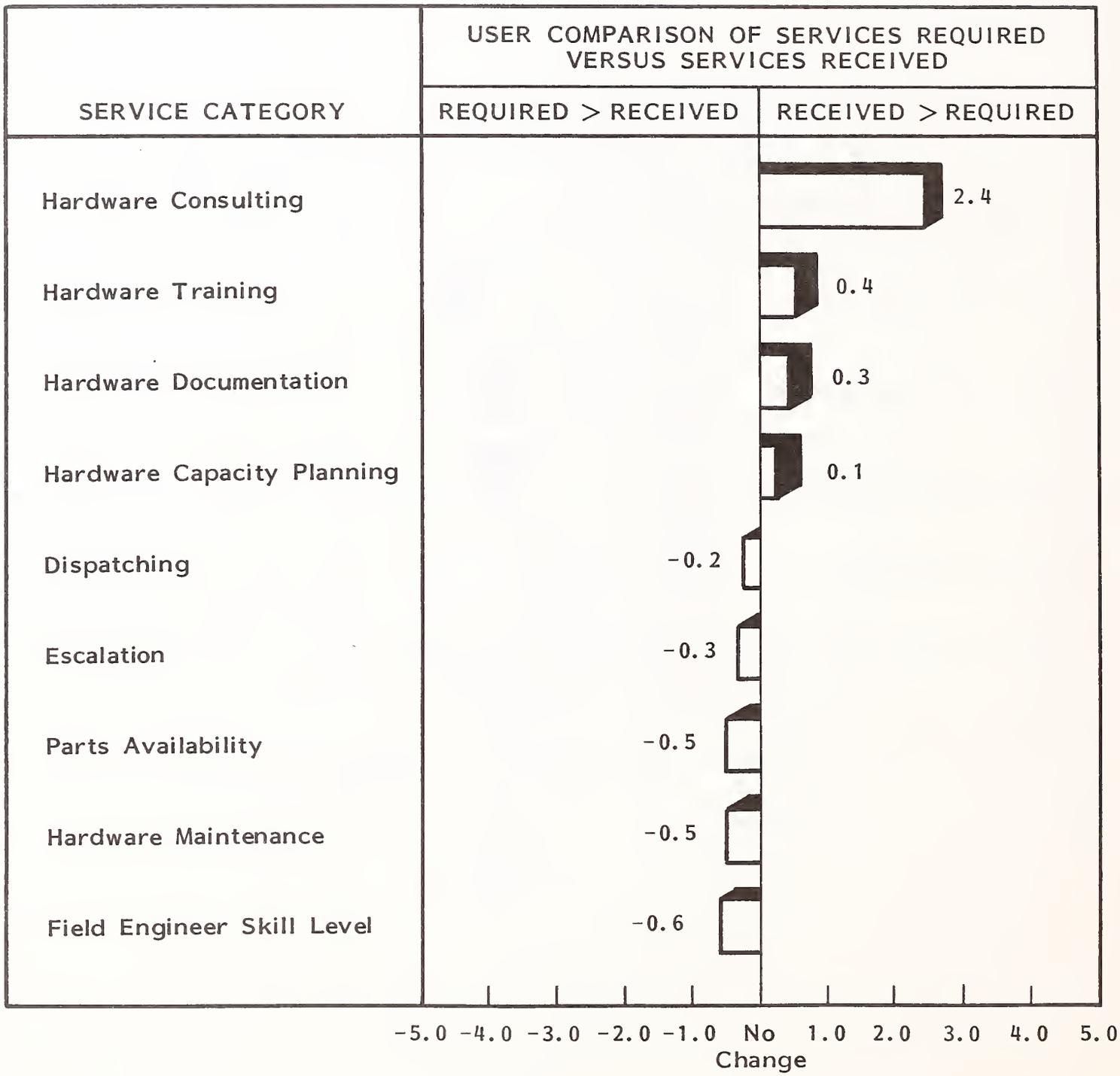


EXHIBIT II-21

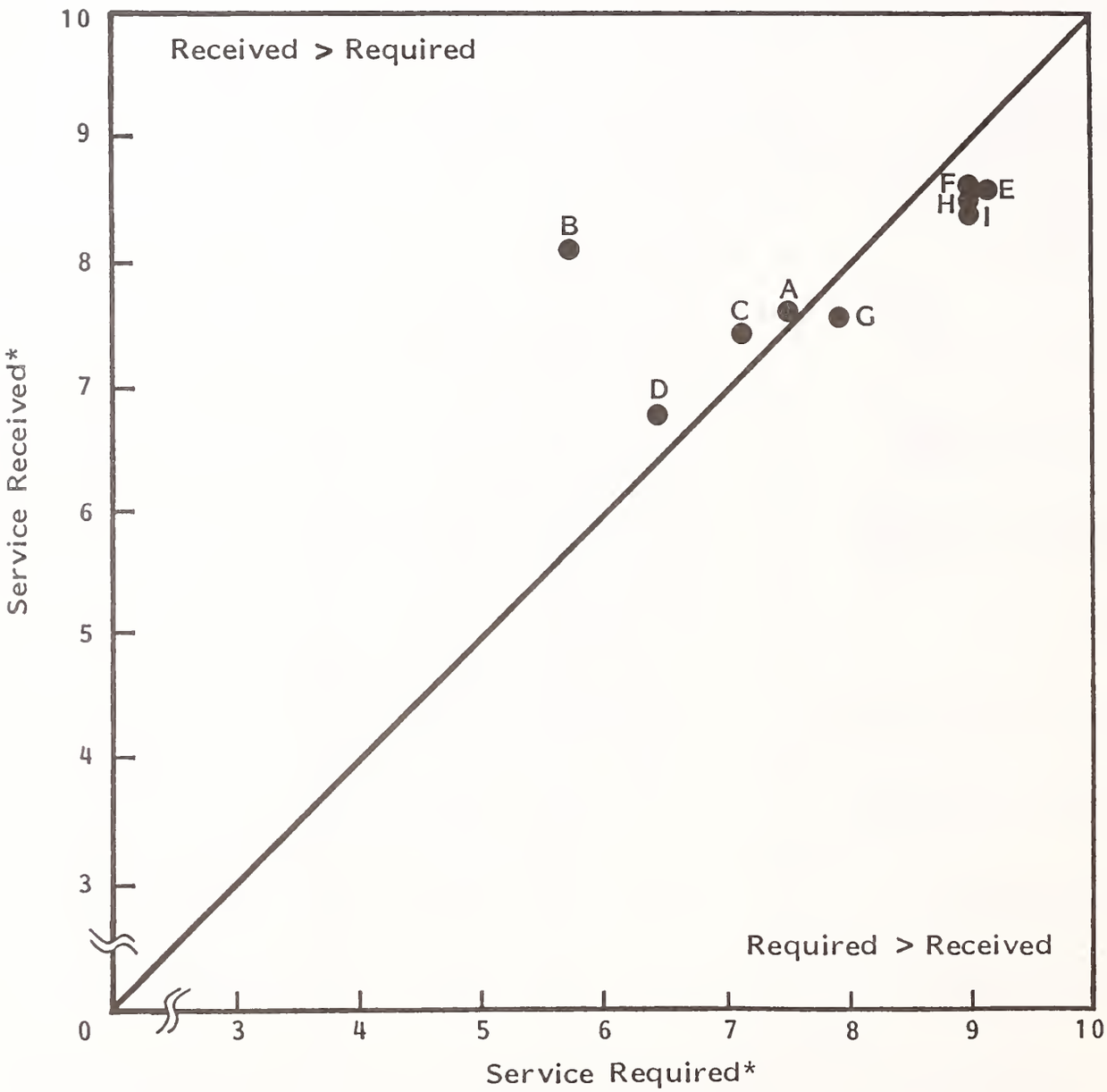
1985 USER SATISFACTION WITH HARDWARE SERVICES
STC

SERVICE CATEGORY	LEVEL OF SERVICE		PERCENT OF USERS SATISFIED
	REQUIRED*	RECEIVED*	
Parts Availability	9.1	8.6	63%
Dispatching	9.0	8.8	75
Hardware Maintenance	9.0	8.5	75
Field Engineer Skill Level	9.0	8.4	63
Escalation	7.9	7.6	44
Hardware Capacity Planning	7.5	7.6	71
Hardware Documentation	7.1	7.4	86
Hardware Training	6.4	6.8	67
Hardware Consulting	5.7	8.1	100

*Rating: 1 = Low, 10 = High

EXHIBIT II-22

STC HARDWARE SUPPORT
USER REQUIREMENTS VERSUS LEVEL OF SERVICE RECEIVED



A. Hardware Capacity Planning
B. Hardware Consulting
C. Hardware Documentation
D. Hardware Training
E. Parts Availability
F. Dispatching
G. Escalation
H. Hardware Maintenance
I. Field Engineer Skill Level

*Rating: 1 = Low, 10 = High

EXHIBIT II-23

STC HARDWARE SERVICE COMPONENT DATA

SERVICE COMPONENT	1985 USER RATING*
Overall Satisfaction with Hardware Service	7.8
Satisfaction with System Availability	9.0
Satisfaction with Response Time	8.4
Satisfaction with Repair Time	8.4

SERVICE COMPONENT	1985 VENDOR PERFORMANCE*
Average Number of Hardware Interruptions per Month	1.4
Average Hardware Response Time (Hours)	1.4
Average Hardware Repair Time (Hours)	1.6

* Rating: 1 = Low, 10 = High

EXHIBIT II-24

USER REQUIREMENTS FOR EXTENDED SERVICES
STC

SERVICE CATEGORY	PERCENT OF USERS REQUIRING SERVICE	AVERAGE PREMIUM USERS ARE WILLING TO PAY (Percent of BMMC)
Preventive Maintenance During Non-Prime Hours	62%	2.5
Stand-By Coverage	38	4.3
Increased Software Support	38	2.5
Remote Diagnostics	25	2.5
On-Site Spare Parts	25	0.1
On-Site Engineer	0	0.1

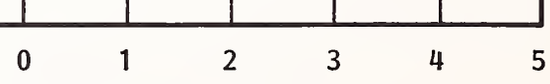
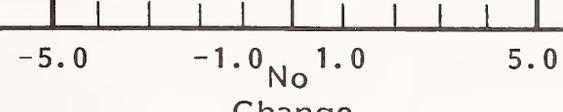


EXHIBIT III-1

CENTRONICS SERVICE PERFORMANCE AND USER RATINGS COMPARISON
1983-1985

SERVICE CATEGORY	PERFORMANCE CHANGE		USER RATING*	
	DECLINE	IMPROVE	1983	1985
Hardware Maintenance		1.5	6.2	7.7
Hardware Consulting		0.8	5.3	6.1
Hardware Documentation	-0.1		6.5	6.4
Hardware Training	-0.4		5.0	4.6



* Rating: 1 = Low, 10 = High

EXHIBIT III-2

VENDOR STRENGTHS AND WEAKNESSES
CENTRONICS

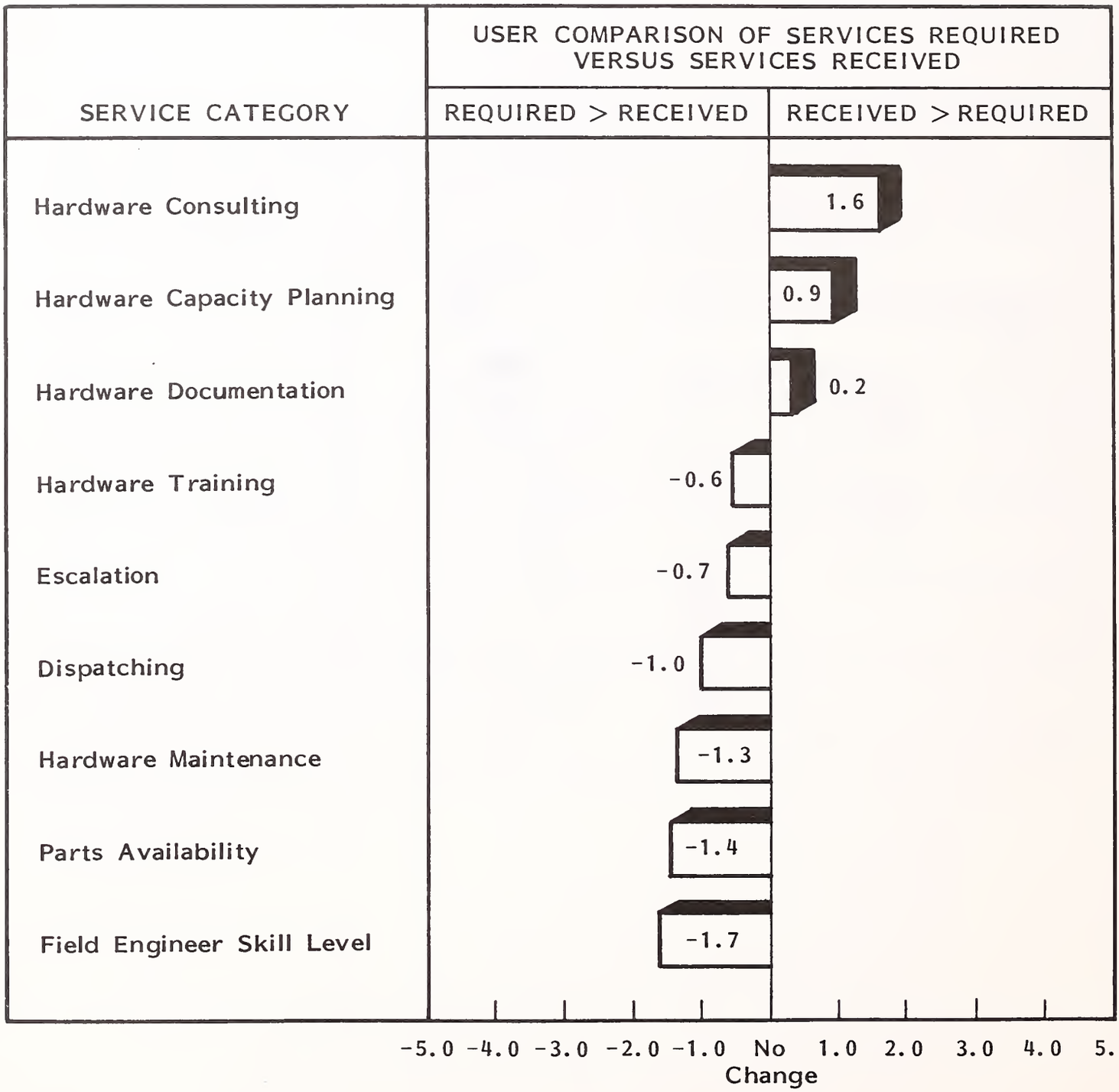


EXHIBIT III-3

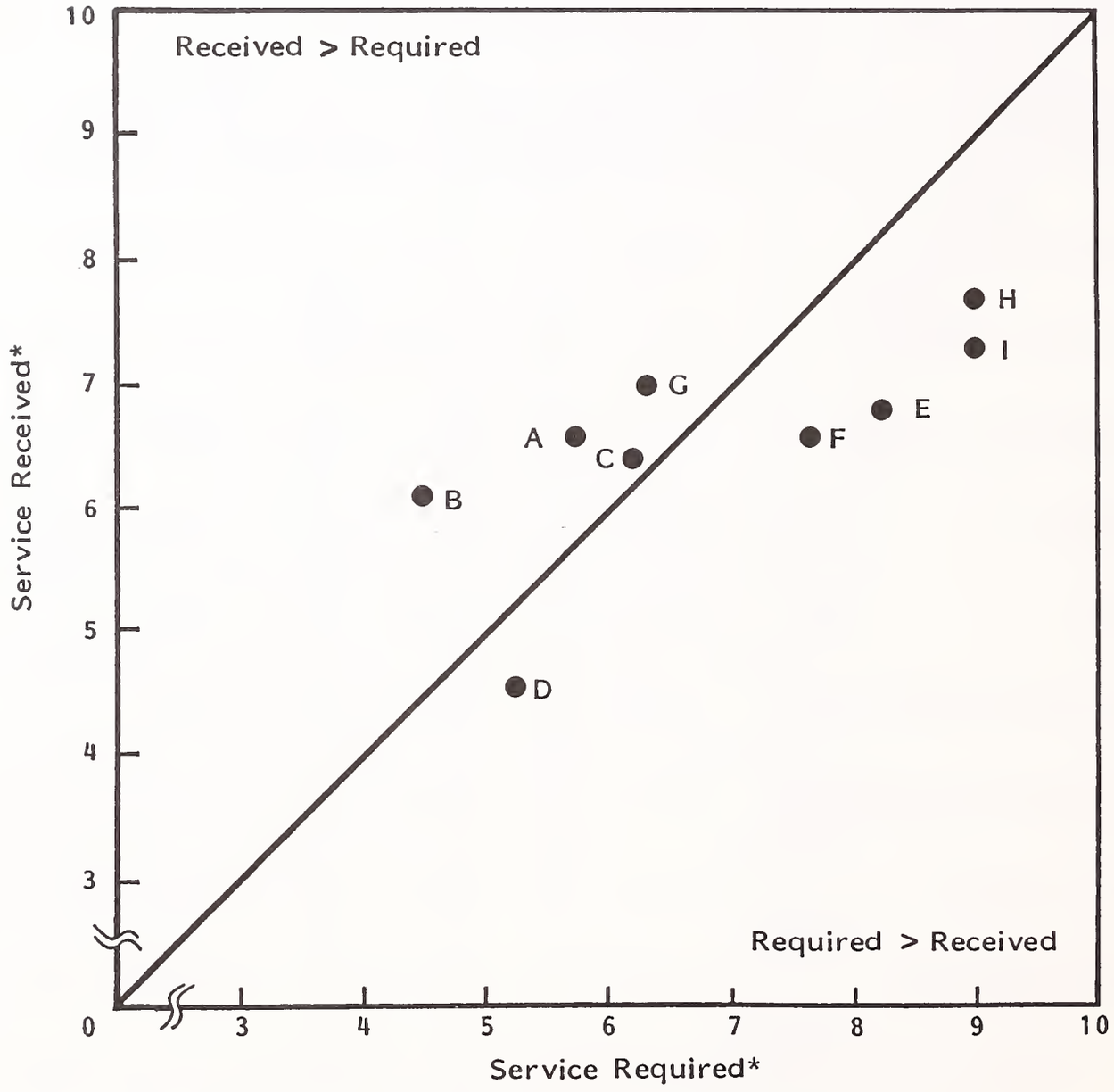
1985 USER SATISFACTION WITH HARDWARE SERVICES
CENTRONICS

SERVICE CATEGORY	LEVEL OF SERVICE		PERCENT OF USERS SATISFIED
	REQUIRED*	RECEIVED*	
Hardware Maintenance	9.0	7.7	9%
Field Engineer Skill Level	9.0	7.3	27
Parts Availability	8.2	6.8	30
Dispatching	7.6	6.6	64
Escalation	6.3	7.0	89
Hardware Documentation	6.2	6.4	60
Hardware Capacity Planning	5.7	6.6	43
Hardware Training	5.2	4.6	44
Hardware Consulting	4.5	6.1	43

*Rating: 1 = Low, 10 = High

EXHIBIT III-4

CENTRONICS HARDWARE SUPPORT
USER REQUIREMENTS VERSUS LEVEL OF SERVICE RECEIVED



A. Hardware Capacity Planning
B. Hardware Consulting
C. Hardware Documentation
D. Hardware Training
E. Parts Availability
F. Dispatching
G. Escalation
H. Hardware Maintenance
I. Field Engineer Skill Level

*Rating: 1 = Low, 10 = High

EXHIBIT III-5

CENTRONICS HARDWARE SERVICE COMPONENT DATA

SERVICE COMPONENT	1985 USER RATING*
Overall Satisfaction with Hardware Service	7.6
Satisfaction with System Availability	7.8
Satisfaction with Response Time	7.0
Satisfaction with Repair Time	7.9

SERVICE COMPONENT	1985 VENDOR PERFORMANCE*
Average Number of Hardware Interruptions per Month	2.0
Average Hardware Response Time (Hours)	6.5
Average Hardware Repair Time (Hours)	1.9

* Rating: 1 = Low, 10 = High

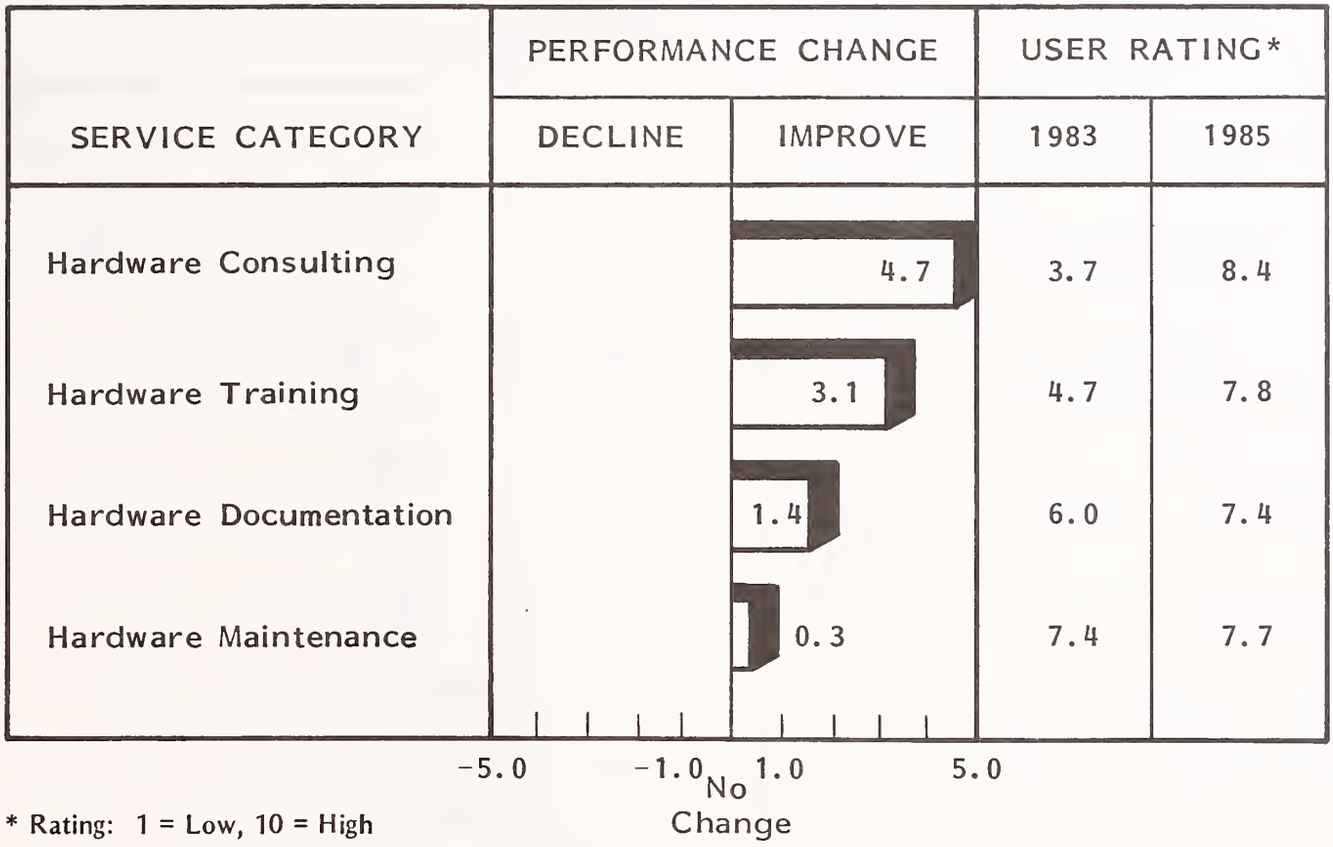
EXHIBIT III-6

USER REQUIREMENTS FOR EXTENDED SERVICES
CENTRONICS

SERVICE CATEGORY	PERCENT OF USERS REQUIRING SERVICE	AVERAGE PREMIUM USERS ARE WILLING TO PAY (Percent of BMMC)
Preventive Maintenance During Non-Prime Hours	25%	1.3
On-Site Spare Parts	25	0.7
Remote Diagnostics	17	0.5
Increased Software Support	8	0.1
On-Site Engineer	0	0.4
Standby Coverage	0	0.1

EXHIBIT III-7

DECISION DATA SERVICE PERFORMANCE AND
USER RATINGS COMPARISON
1983-1985



* Rating: 1 = Low, 10 = High

EXHIBIT III-8

VENDOR STRENGTHS AND WEAKNESSES
DECISION DATA

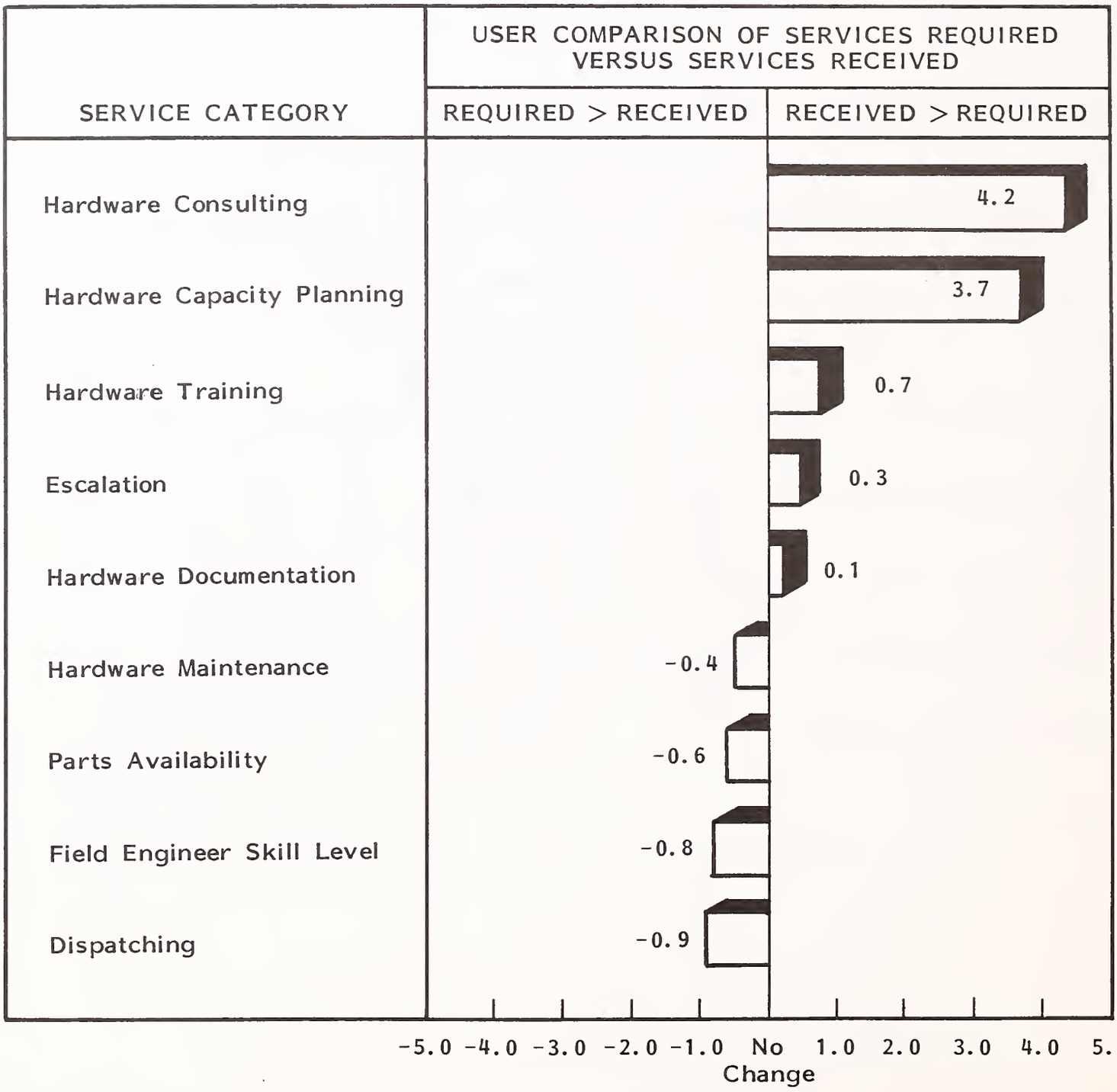


EXHIBIT III-9

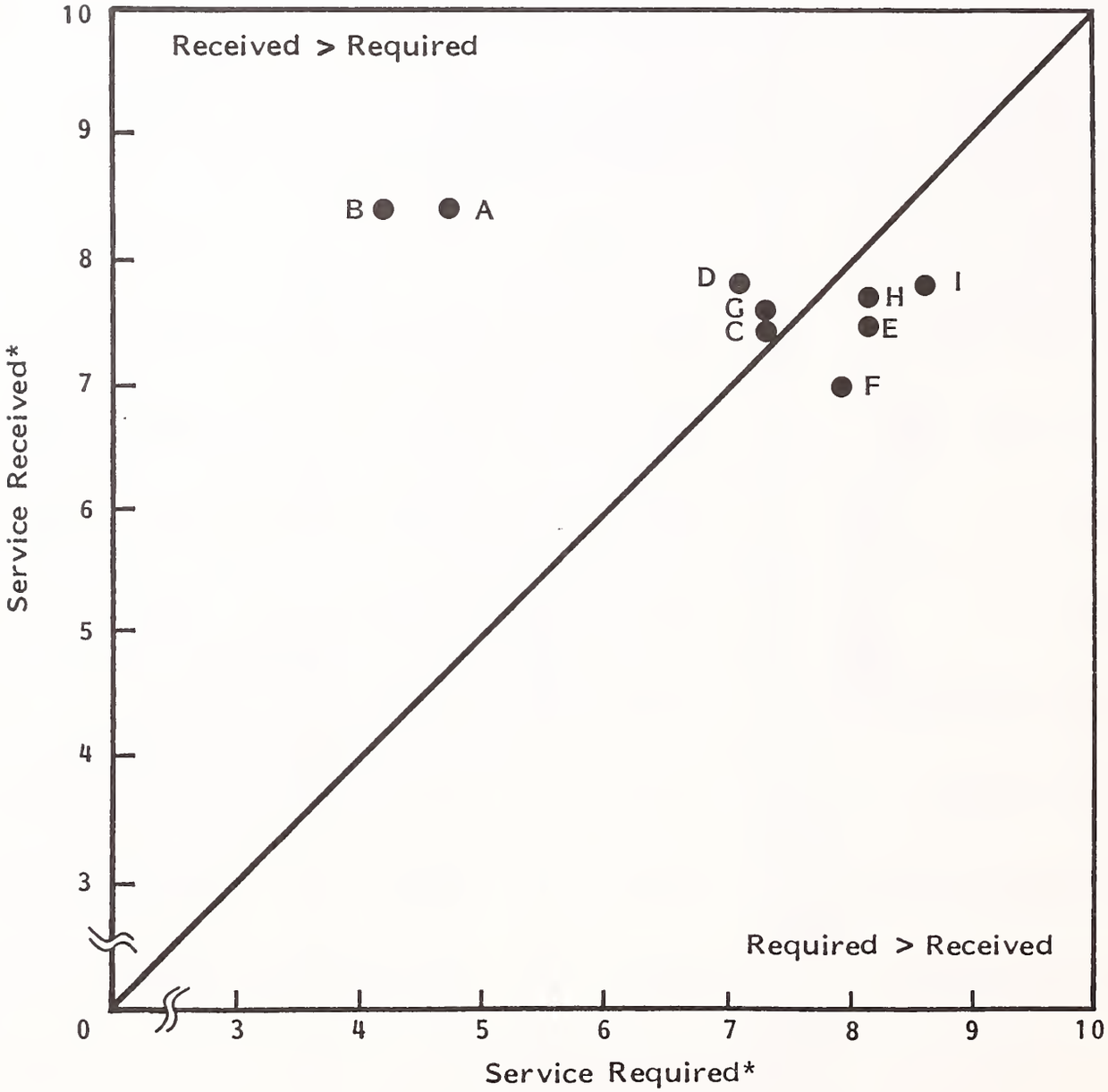
1985 USER SATISFACTION WITH HARDWARE SERVICES
DECISION DATA

SERVICE CATEGORY	LEVEL OF SERVICE		PERCENT OF USERS SATISFIED
	REQUIRED*	RECEIVED*	
Field Engineer Skill Level	8.6	7.8	56%
Hardware Maintenance	8.1	7.7	72
Parts Availability	8.1	7.5	60
Dispatching	7.9	7.0	68
Escalation	7.3	7.6	88
Hardware Documentation	7.3	7.4	76
Hardware Training	7.1	7.8	90
Hardware Capacity Planning	4.7	8.4	92
Hardware Consulting	4.2	8.4	96

*Rating: 1 = Low, 10 = High

EXHIBIT III-10

DECISION DATA HARDWARE SUPPORT
USER REQUIREMENTS VERSUS LEVEL OF SERVICE RECEIVED



A. Hardware Capacity Planning
B. Hardware Consulting
C. Hardware Documentation
D. Hardware Training
E. Parts Availability
F. Dispatching
G. Escalation
H. Hardware Maintenance
I. Field Engineer Skill Level

*Rating: 1 = Low, 10 = High

EXHIBIT III-11

DECISION DATA HARDWARE SERVICE COMPONENT DATA

SERVICE COMPONENT	1985 USER RATING*
Overall Satisfaction with Hardware Service	7.1
Satisfaction with System Availability	8.5
Satisfaction with Response Time	8.0
Satisfaction with Repair Time	8.1

SERVICE COMPONENT	1985 VENDOR PERFORMANCE*
Average Number of Hardware Interruptions per Month	1.0
Average Hardware Response Time (Hours)	5.9
Average Hardware Repair Time (Hours)	1.4

* Rating: 1 = Low, 10 = High

EXHIBIT III-12

USER REQUIREMENTS FOR EXTENDED SERVICES
DECISION DATA

SERVICE CATEGORY	PERCENT OF USERS REQUIRING SERVICE	AVERAGE PREMIUM USERS ARE WILLING TO PAY (Percent of BMMC)
Increased Software Support	76%	0
Preventive Maintenance During Non-Prime Hours	40	7.8
On-Site Spare Parts	40	6.8
Standby Coverage	24	1.8
On-Site Engineer	12	6.4
Remote Diagnostics	12	0.4

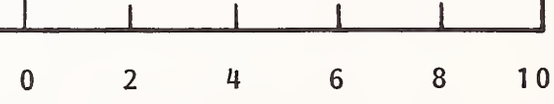
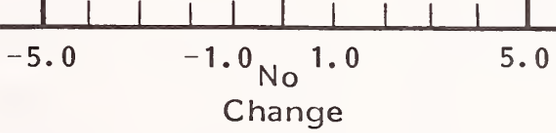


EXHIBIT III-13

IBM SERVICE PERFORMANCE AND
USER RATINGS COMPARISON
1983-1985

SERVICE CATEGORY	PERFORMANCE CHANGE		USER RATING*	
	DECLINE	IMPROVE	1983	1985
Hardware Documentation		1.6	6.8	8.4
Hardware Training		1.2	6.4	7.6
Hardware Consulting		0.9	6.1	7.0
Hardware Maintenance		0.5	7.7	8.2



* Rating: 1 = Low, 10 = High

EXHIBIT III-14

VENDOR STRENGTHS AND WEAKNESSES

IBM

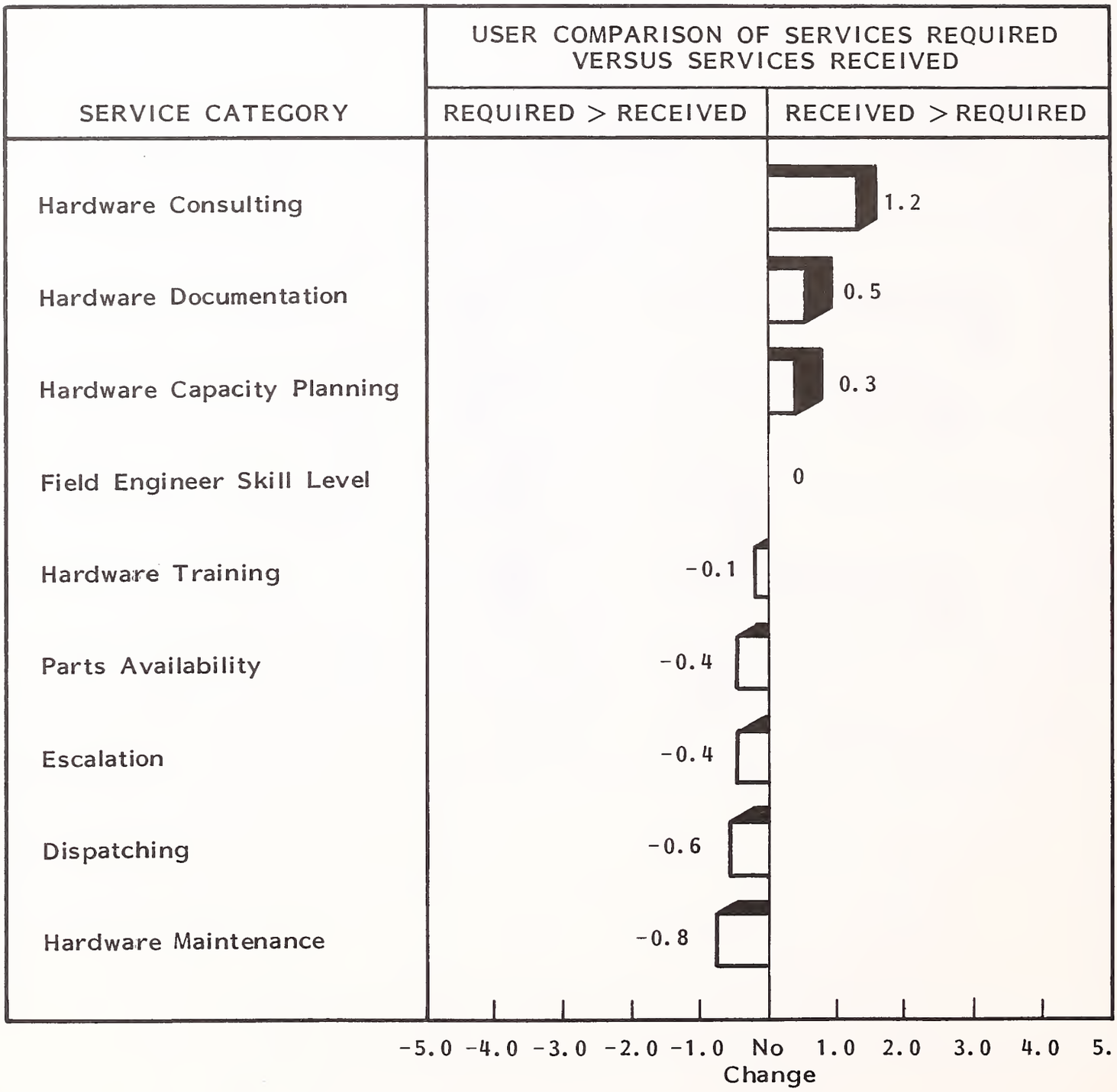


EXHIBIT III-15

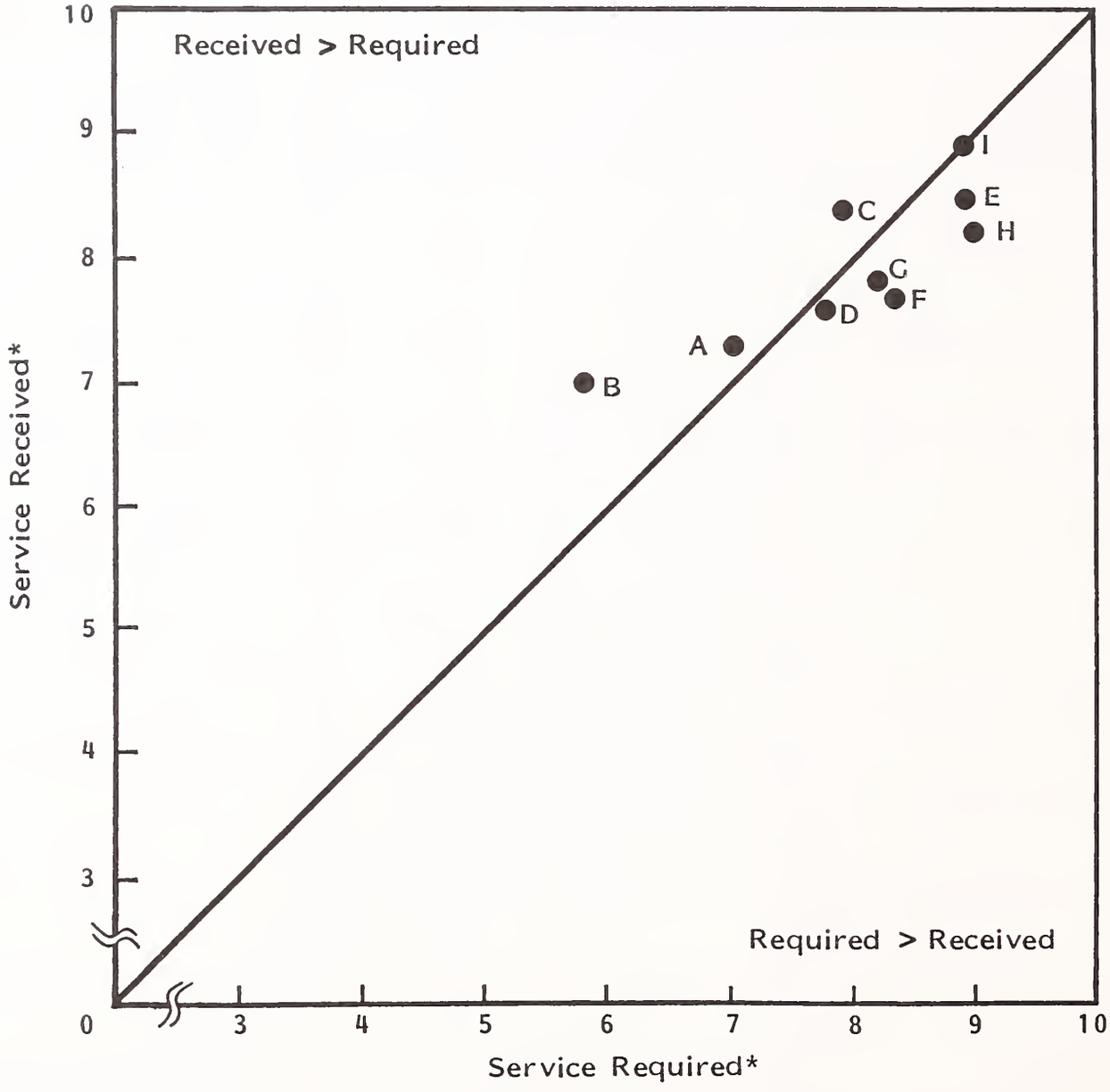
1985 USER SATISFACTION WITH HARDWARE SERVICES
IBM

SERVICE CATEGORY	LEVEL OF SERVICE		PERCENT OF USERS SATISFIED
	REQUIRED*	RECEIVED*	
Hardware Maintenance	9.0	8.2	54%
Field Engineer Skill Level	8.9	8.9	76
Parts Availability	8.9	8.5	63
Dispatching	8.3	7.7	59
Escalation	8.2	7.8	65
Hardware Documentation	7.9	8.4	79
Hardware Training	7.7	7.6	59
Hardware Capacity Planning	7.0	7.3	66
Hardware Consulting	5.8	7.0	75

*Rating: 1 = Low, 10 = High

EXHIBIT III-16

IBM HARDWARE SUPPORT
USER REQUIREMENTS VERSUS LEVEL OF SERVICE RECEIVED



A. Hardware Capacity Planning
B. Hardware Consulting
C. Hardware Documentation
D. Hardware Training
E. Parts Availability
F. Dispatching
G. Escalation
H. Hardware Maintenance
I. Field Engineer Skill Level

*Rating: 1 = Low, 10 = High

EXHIBIT III-17

IBM HARDWARE SERVICE COMPONENT DATA

SERVICE COMPONENT	1985 USER RATING*
Overall Satisfaction with Hardware Service	8.5
Satisfaction with System Availability	8.7
Satisfaction with Response Time	8.7
Satisfaction with Repair Time	8.4

SERVICE COMPONENT	1985 VENDOR PERFORMANCE*
Average Number of Hardware Interruptions per Month	6.7
Average Hardware Response Time (Hours)	1.2
Average Hardware Repair Time (Hours)	1.9

* Rating: 1 = Low, 10 = High

EXHIBIT III-18

USER REQUIREMENTS FOR EXTENDED SERVICES
IBM

SERVICE CATEGORY	PERCENT OF USERS REQUIRING SERVICE	AVERAGE PREMIUM USERS ARE WILLING TO PAY (Percent of BMMC)
Preventive Maintenance During Non-Prime Hours	77%	11.6
On-Site Engineer	69	6.3
Remote Diagnostics	66	4.3
On-Site Spare Parts	57	5.5
Standby Coverage	34	2.2
Increased Software Support	14	1.0

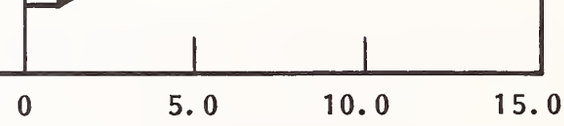


EXHIBIT III-19

XEROX SERVICE PERFORMANCE AND
USER RATINGS COMPARISON
1983-1985

SERVICE CATEGORY	PERFORMANCE CHANGE		USER RATING*	
	DECLINE	IMPROVE	1983	1985
Hardware Documentation		1.1	6.8	7.9
Hardware Maintenance		1.1	6.8	7.9
Hardware Consulting	-0.4		6.3	5.9
Hardware Training	-1.1		6.3	5.2

-5.0 -1.0 No Change 1.0 5.0

* Rating: 1 = Low, 10 = High

EXHIBIT III-20

VENDOR STRENGTHS AND WEAKNESSES
XEROX

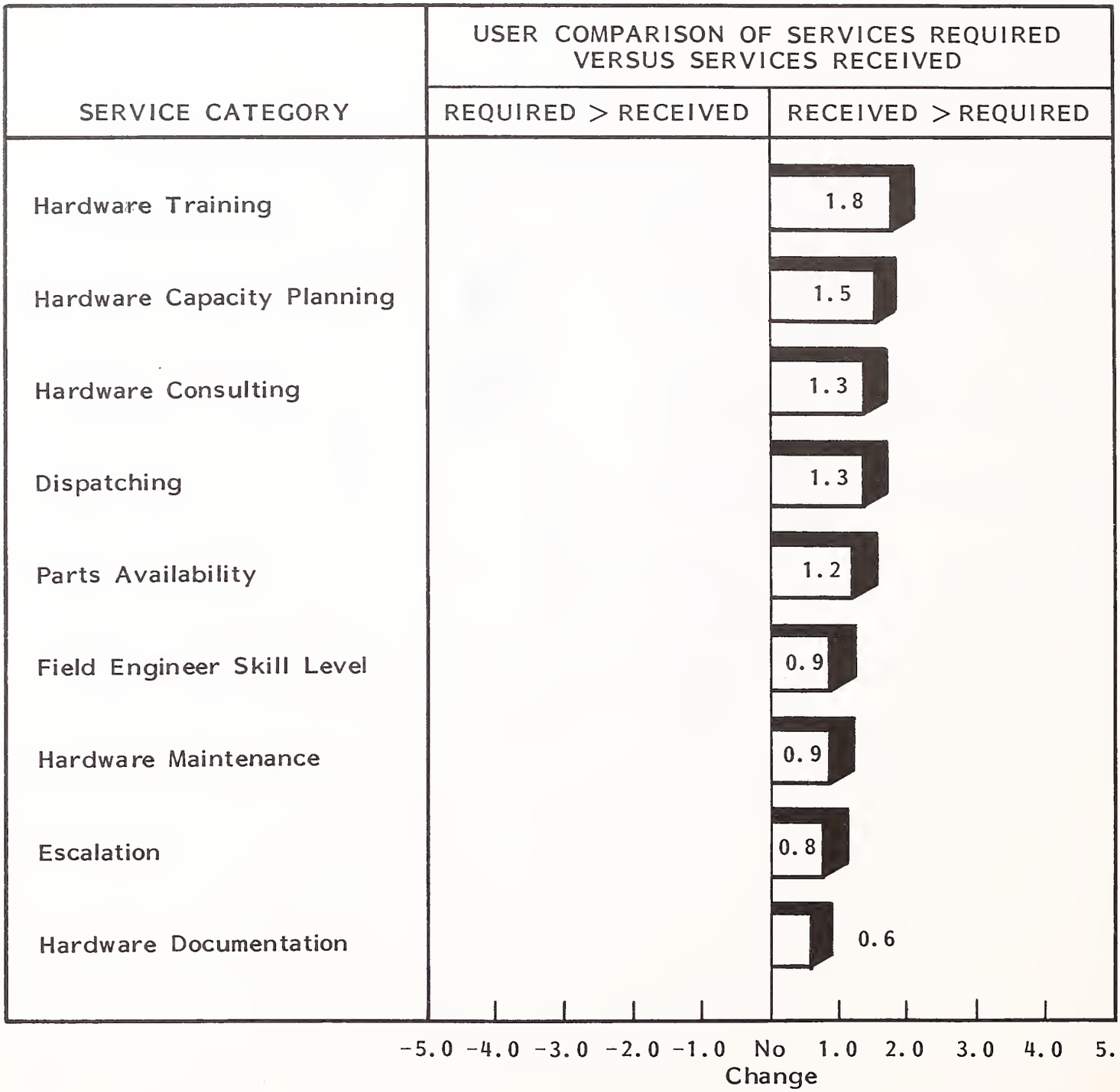


EXHIBIT III-21

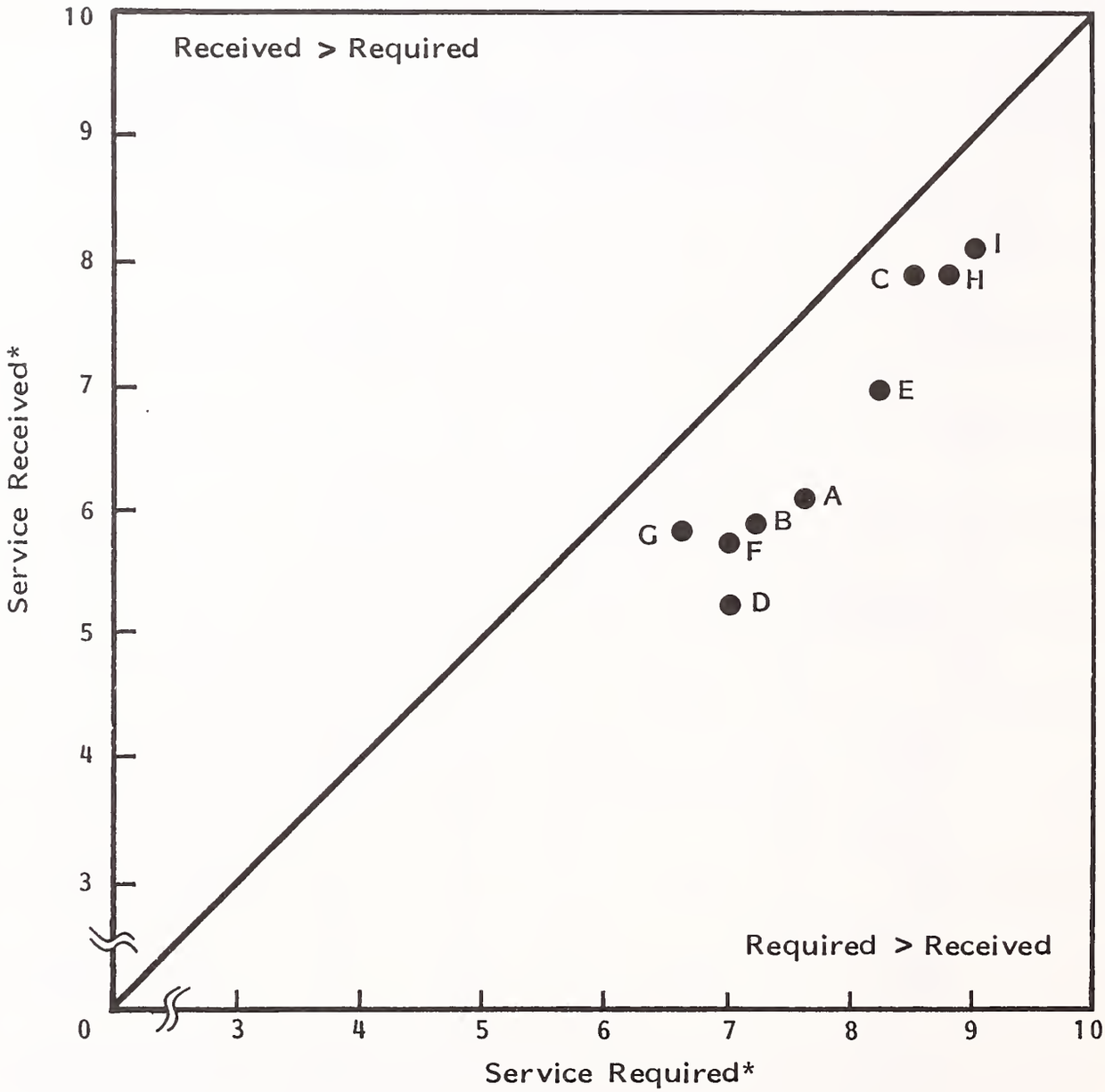
1985 USER SATISFACTION WITH HARDWARE SERVICES
XEROX

SERVICE CATEGORY	LEVEL OF SERVICE		PERCENT OF USERS SATISFIED
	REQUIRED*	RECEIVED*	
Field Engineer Skill Level	9.0	8.1	44%
Hardware Maintenance	8.8	7.9	40
Hardware Documentation	8.5	7.9	60
Parts Availability	8.2	7.0	47
Hardware Capacity Planning	7.6	6.1	27
Hardware Consulting	7.2	5.9	42
Dispatching	7.0	5.7	51
Hardware Training	7.0	5.2	38
Escalation	6.6	5.8	47

*Rating: 1 = Low, 10 = High

EXHIBIT III-22

XEROX HARDWARE SUPPORT
USER REQUIREMENTS VERSUS LEVEL OF SERVICE RECEIVED



A. Hardware Capacity Planning
B. Hardware Consulting
C. Hardware Documentation
D. Hardware Training
E. Parts Availability
F. Dispatching
G. Escalation
H. Hardware Maintenance
I. Field Engineer Skill Level

*Rating: 1 = Low, 10 = High

EXHIBIT III-23

XEROX HARDWARE SERVICE COMPONENT DATA

SERVICE COMPONENT	1985 USER RATING*
Overall Satisfaction with Hardware Service	7.3
Satisfaction with System Availability	7.7
Satisfaction with Response Time	7.3
Satisfaction with Repair Time	7.3

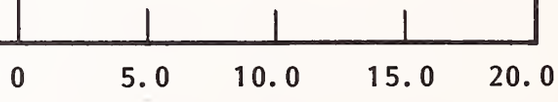
SERVICE COMPONENT	1985 VENDOR PERFORMANCE*
Average Number of Hardware Interruptions per Month	8.4
Average Hardware Response Time (Hours)	1.9
Average Hardware Repair Time (Hours)	1.6

* Rating: 1 = Low, 10 = High

EXHIBIT III-24

USER REQUIREMENTS FOR EXTENDED SERVICES
XEROX

SERVICE CATEGORY	PERCENT OF USERS REQUIRING SERVICE	AVERAGE PREMIUM USERS ARE WILLING TO PAY (Percent of BMMC)
Preventive Maintenance During Non-Prime Hours	91%	13.9
On-Site Spare Parts	79	5.7
Remote Diagnostics	58	4.3
On-Site Engineer	30	6.0
Increased Software Support	28	3.3
Standby Coverage	28	3.0



APPENDIX A

DEMOGRAPHICS

1. Peripheral Manufacturer _____

2. Peripheral Model _____

3. Peripheral Installed Age (Years) _____

4. Current Maintenance Coverage on Peripheral (e.g. BBMC, T&M, 24 X7)

_____

5. Length of Service Relationship With Current Vendor (Years) _____

6. Distance from Service Outlet to User's Site (Miles) _____

MAINTENANCE

7. On a scale of 1 to 10, where 1 = low and 10 = high, please rate your service vendor in the following categories:

   a. Overall satisfaction with Service _____

   b. Satisfaction with Hardware Service _____

   c. Price of Service _____

8. If your company were to purchase a computer today, how important would each of these features be (1 to 10) in the purchase decision process:

   a. System Price _____

   b. System Capabilities _____

   c. Reliability _____

   d. Maintenance Response Time _____

   e. Maintenance Repair Time _____

   f. Price of Maintenance _____

   g. Vendor Reputation for Maintenance _____

9. How many system interruptions do you have each month? _____

   a. What percent of system interruptions are hardware related? _____%

   b. Software related? _____%

10. How many hours a week is your system typically used? _____

11. What percent of your weekly schedule is the system available (on average, over the past 6 months)?

    _____

12. How many hours does it take your vendor to respond (on-site) once you have placed the first call?

    _____

13. How many hours does it take the vendor to repair the equipment once the FE is on site?

    _____

14. Again, on a scale of 1 to 10, how satisfied are you with:

    a. System availability _____

    b. Hardware response time _____

    c. Hardware repair time _____

15a. Please rate, on a scale of 1 to 10, your requirements for the following hardware goods and services:

b. Please rate your current level of satisfaction with the services you receive from your hardware maintenance vendor:

Vendor Goods and Services	Requirement (1 to 10)	Current Level (1 to 10)
1. Hardware capacity planning		
2. Hardware consulting		
3. Hardware documentation		
4. Hardware training		
5. Parts availability		
6. Dispatching		
7. Escalation		
8. Hardware maintenance		
9. FE skill level		

THIRD-PARTY MAINTENANCE

16. Do you currently use third-party maintenance on any of your DP equipment?

☐ Yes ☐ No

17. (If no), have you considered using TPM? ☐ Yes ☐ No

18. (If yes on 16) for what product(s) are you using third-party maintenance?

_____

19. On a scale of 1 to 10, how satisfied are you with the TPM service you are now receiving? (if yes on 16)

_____

PRICING

20a. Do you have a requirement for any of the following services?

b. On a scale of 1 to 10, how important is your requirement for the service?

c. What would you consider a reasonable premium for these services (over and above your BMMC)?

Service	a. Yes/No	b. 1 to 10	c. Percent
1. Standby coverage			%
2. On-site spare parts			%
3. Remote diagnostics			%
4. PMs (preventive maintenance) during non-prime hours)			%
5. Full-time on-site engineer			%

Thank You.

APPENDIX B: DATA BASE FORMAT

A. OVERVIEW OF THE DATA BASE

- As mentioned in the Introduction, INPUT conducted 186 interviews of printer and disk drive users as the basis of this report. Each interview was conducted over the telephone and recorded on questionnaire forms like the one in Appendix A. Overall, each questionnaire contains 64 data items along with 16 fields of demographic data.

- After the questionnaires were completed and verified, the user responses were entered an IBM personal computer using dBASE III, a relational data base management system produced by Ashton Tate (Culver City, CA). The resulting data base has 116 fields corresponding to individual question on the questionnaire in Appendix B.

- The principal advantage of dBASE III over dBASE II, the data base package previously used by INPUT, is that all data can be included into one file as opposed to five files used with dBASE II. INPUT's 1985 peripheral user requirement data is stored in a file titled "FUA6.DBF." The structure of the data base is included in Exhibit B-1.

EXHIBIT B-1

FUA6 FILE STRUCTURE

FIELD NUMBER	FIELD NAME	TYPE	WIDTH
1	CATNO	Numeric	3
2	COMPANY	Character	60
3	ADDRESS	Character	30
4	CITY	Character	20
5	STATE	Character	2
6	ZIP	Character	5
7	REVENUES	Character	4
8	EMPLOYEES	Character	6
9	NAME	Character	30
10	TITLE	Character	20
11	PHONE	Character	13
12	INDUSTRY	Character	25
13	Q1	Character	15
14	Q2	Character	10
15	Q3	Numeric	3
16	Q4	Character	10
17	Q5	Numeric	3
18	Q6	Numeric	4
19	Q7A	Numeric	2
20	Q7B	Numeric	2
21	Q7C	Numeric	2
22	Q7D	Numeric	2
23	Q8A	Numeric	2
24	Q8B	Numeric	2
25	Q8C	Numeric	2
26	Q8D	Numeric	2
27	Q8E	Numeric	2
28	Q8F	Numeric	2
29	Q8G	Numeric	2
30	Q9	Numeric	3
31	Q9A	Numeric	3
32	Q9B	Numeric	3
33	Q10	Numeric	3
34	Q11	Numeric	3
35	Q12	Numeric	5
36	Q13	Numeric	5
37	Q14A	Numeric	2
38	Q14B	Numeric	2
39	Q14C	Numeric	2

FIELD NUMBER	FIELD NAME	TYPE	WIDTH
40	Q15A1	Numeric	2
41	Q15B1	Numeric	2
42	Q15A2	Numeric	2
43	Q15B2	Numeric	2
44	Q15A3	Numeric	2
45	Q15B3	Numeric	2
46	Q15A4	Numeric	2
47	Q15B4	Numeric	2
48	Q15A5	Numeric	2
49	Q15B5	Numeric	2
50	Q15A6	Numeric	2
51	Q15B6	Numeric	2
52	Q15A7	Numeric	2
53	Q15B7	Numeric	2
54	Q15A8	Numeric	2
55	Q15B8	Numeric	2
56	Q15A9	Numeric	2
57	Q15B9	Numeric	2
58	Q16	Character	1
59	Q17	Character	1
60	Q18	Character	10
61	Q19	Numeric	2
62	Q20A1	Character	1
63	Q20B1	Numeric	2
64	Q20C1	Numeric	3
65	Q20A2	Character	1
66	Q20B2	Numeric	2
67	Q20C2	Numeric	3
68	Q20A3	Character	1
69	Q20B3	Numeric	2
70	Q20C3	Numeric	3
71	Q20A4	Character	1
72	Q20B4	Numeric	2
73	Q20C4	Numeric	3
74	Q20A5	Character	1
75	Q20B5	Numeric	2
76	Q20C5	Numeric	3
77	Q20A6	Character	1
78	Q20B6	Numeric	2
79	Q20C6	Numeric	3

B. ANALYSIS OF THE DATA BASE FILES

- INPUT utilizes ABSTAT, a statistical analysis packed designed to "read" dBASE III files, to analyze the data in the large system user requirements file, FUA1.DBF. ABSTAT is produced by Anderson-Bell (Carson City, CO).

- Time and space constraints prevented INPUT from accessing any but the most obvious statistical conclusions resulting from the data in the file FUA6.DBF. Some of the statistical analysis "cuts" that looked promising include:

  - Analysis of service performance by region.

  - Effect of installed age of CPU on system availability and service performance.

  - Detailed analysis of service performance by individual and competing products.

- Clients that wish to have access to the raw data resulting from the 186 questionnaire survey of peripheral users should request the diskette in writing to INPUT's main office in Mountain View (CA). Unless told otherwise, INPUT will assume a standard format of:

  - IBM-PC.

  - PC-DOS 2.01.

  - 380K.

  - dBASE III compatible file structure.

- INPUT can make the data available in nonstandard formats. Please call or write for a full listing of formats.

- Clients that do not wish to analyze the data themselves can utilize INPUT's Client Inquiry Service (Hotline) to access the data. The Hotline staff work with the program consultants to provide additional information about this (and all others) INPUT reports.

APPENDIX C: DEFINITIONS

- APPLICATION SOFTWARE - Software that performs procession service and user function.

- CONSULTING - Includes analysis of user requirements and the development of a specific action plan to meet user service and suppot needs.

- DISPATCHING - The process of allocating service resources to solve a support related problem.

- DOCUMENTATION - All manuals, newsletters, and text designed to serve as reference material for the ongoing operation or repair of hardware or software.

- END USER - May buy a system from the hardware supplier(s) and do his own programming, interfacing and installation. Alternatively, he may buy a turnkey system from a systems house or hardware integrator.

- ENGINEERING CHANGE NOTICE (ECN) - Product changes to improve the product after it has been released to production.

- ENGINEERING CHANGE ORDER (ECO) - The follow-up to ECNs which include parts and a bill of material to effect the change in hardware.

- ESCALATION - The process of increasing the level of support when and if the field engineer cannot correct a hardware or software problem within a prescribed amount of time, usually two to four hours for hardware.

- FIELD ENGINEER (FE) - For the purpose of this study, field engineer, customer engineer, serviceperson and maintenance person were used interchangeably and refer to the individual who responds to a user's service call to repair a device or system.

- HARDWARE INTEGRATOR - Develops system interface electronics and controllers for the CPU, sensors, peripherals and all other ancillary hardware components. He may also develop control system software in addition to installing the entire system at the end user site.

- LARGE SYSTEM - Refers to traditional mainframe including at the low end IBM 4300-like machines and at the high end IBM 308X-like machines. Large systems have a maximum word length of 32 bits and a standard configuration price of $350,000 and higher.

- MEAN TIME BETWEEN FAILURES (MTBF) - The elapsed time between hardware failures on a device or a system.

- MEAN TIME TO REPAIR - The elapsed time from the arrival of the field engineer on the user's site until the device is repaired and returned to the user for his utilization.

- MEAN TIME TO RESPOND - The elapsed time between the user placement of a service call and the arrival at the user's location of a field engineer.

- MINICOMPUTER - See Small System.

- OPERATING SYSTEM SOFTWARE (SYSTEMS SOFTWARE) - Software that enables the computer systems to perform basic function including system control, utilities, and application development.

- PERIPHERALS - Include all input, output, and storage devices, other than main memory, which are locally connected to the main processor and are not generally included in other categories, such as terminals.

- PLANNING - Includes the development of procedures, ditribution, organization, and configuration of support services. For example, capacity planning "installation" planning.

- PLUG-COMPATIBLE MAINFRAME (PCM) - Mainframe computers that are compatible with and can execute programs on equivalent IBM mainframe. The two major PCM vendors at this time are Amdahl and National Advanced Systems.

- SMALL BUSINESS COMPUTER - For the purpose of this study, is a system which is built around a Central Processing Unit (CPU), has the ability to utilize at least 20M bytes of disk capacity, provides multiple CRT workstations and offers business-oriented system software support.

- SOFTWARE ENGINEER (SE) - The individual that responds (either on-site or via remote support) to a users service call to repair or patch operating system and/or applications software.

- SMALL SYSTEM - Refers to traditional minicomputer and superminicomputer systems ranging from small mutliuser, 16-bit system at the low end to sophisticated 32-bit machines at the high end.

- SOFTWARE PRODUCTS - Systems and applications packages, which are sold to computer users by equipment manufacturers, independent vendors and others. Also included are fees for work performed by the vendor to implement a package at the user's site.

- SUPERMINICOMPUTER - See Small System.

- SYSTEMS HOUSE - Integrates hardware and software into a total turnkey system to satisfy the data processing requirements of the end user. He may also develop system software products for license to end users.

- SYSTEM INTERRUPTION - Any system downtime requiring an Initial Program Load (IPL).

- TRAINING - All audio, visual, and computer based documentation, materials, and live instruction designed to educate users and support personnel in the ongoing operation or repair of hardware and software.

- TURNKEY SYSTEM - Composed of hardware and software integrated into a total system designed to completely fulfill the processing requirements of a single application.

About INPUT

INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, and office products and services.

The company carries out continuous and in-depth research. Working closely with clients on important issues, INPUT's staff members analyze and interpret the research data, then develop recommendations and innovative ideas to meet clients' needs. Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

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